CLMPTO

10/009,539

10/29/2001

swh

Please Cancel Claims 1-38

Please Add New Claims as follows

39. A method for compressing and transmitting image raster data of pages, comprising the steps of:

generating a data stream of image raster data from language elements of a graphics language, said data stream containing grey image areas in a form of dither cells whose gray scale values are determined by model dither cells;

dividing said image raster data of each one of said pages into tiles of a two-dimensional grid network, each of said tiles include a plurality of said image raster data;

identifying appertaining ones of model dither cells and said gray scale values for each of said tiles that contains only dither cells, and marking said tiles that contains only dither cells to produce marked tiles; and

transmitting characteristic data of said marked tiles for further processing of said image raster data, said characteristic data containing information about a position of a respective one of said tiles and a respective one of said gray scale values.

40. A method as claimed in claim 39, wherein said dither cells picture elements that are arranged one of rectangularly and quadratically; and

wherein said model dither cell with a higher gray scale value at least contains inked picture elements at same positions as said model dither cell with a next-lower gray scale value.

41. A method as claimed in claim 40, further comprising the step of:

checking each of said tiles to see whether said tiles contain dither cells of a type of said model dither cell with a lowest gray scale value.

42. A method as claimed in claim 41, wherein said step of checking includes checking tiles tile row by tile row, including investigating a first row first per tile; and,

given a lack of coincidence, the appertaining tile is investigated no further.

43. A method as claimed in claim 41, further comprising the step of:
determining said model dither cell with a highest gray scale value that is contained in all
dither cells of a tile for the tile that contains dither cells of a type of said model
dither cell with said lowest gray scale value; and
assigning a gray scale value of said model dither cell to said tile.

44. A method as claimed in claim 39, wherein said tiles have a uniform row length.

45. A method as claimed in claim 44, wherein said uniform row length corresponds
to a bit length of a register of a hardware module with which the present method is
implemented.

46. A method as claimed in claim 44, wherein said uniform row length amounts to
one of 8, 16, 32, 64 and 128 bits or an additive combination thereof.

47. A method as claimed in claim 46, further comprising the step of:
comparing using a comparison row that contains only said model dither cells and whose
length at least corresponds to said uniform row length of a tile so as to determine
whether a tile contains dither cells at least with said lowest gray scale value
corresponding to said model dither cell; and
implementing said comparing step tile row by tile row.

48. A method as claimed in claim 47, wherein the length of said comparison row
amounts to a smallest common multiple of row length of a tile and row length of said dither
cell.

49. A method as claimed in claim 48, wherein said dither cell has one of an 8x8 and 16x16 picture element matrix.

50. A method as claimed in claim 47, further comprising the step of:
using said comparison row with appertaining model dither cells for each gray scale value.

51. A method as claimed in claim 39, further comprising the step of:
combining neighboring tiles having a prescribed gray scale value corresponding to said
    model dither cell to form a polygon; and
transmitting said characteristic data of said polygon for further processing of said image
    raster data.

52. A method as claimed in claim 51, wherein said transmitting step transits said characteristic data in compressed form.

53. A method as claimed in claim 51, wherein said polygon is one of a square and a rectangle.

54. A method as claimed in claim 53, wherein said combining step combines said tiles to form a rectangle have a common minimal gray scale value; and
wherein said transmitting step transmits said characteristic data of said rectangle.

55. A method as claimed in claim 54, wherein said rectangle contains a sub-rectangle whose tiles have a minimum gray scale value that is higher than a gray scale value of the tiles of said rectangle.

56. A method as claimed in claim 54, further comprising the steps of:
producing a list of rectangles; and

transmitting said characteristic data of said list.

57. A method as claimed in claim 56, wherein said transmitting step transmits said characteristic data in compressed form.

58. A method as claimed in claim 56, further comprising the steps of:
organizing said list such that rectangles with a descending plurality of tiles assume a
descending rank in the list; and
transmitting only those rectangles from said list whose plurality of tiles exceeds a
predetermined value for further processing.

59. A method as claimed in claim 56, further comprising the step of:
limiting a number of rectangles of said list to a predetermined value.

60. A method as claimed in claim 54, further comprising the steps of:
expanding boundaries of said rectangles by incorporating into an expanded rectangle dither
cells of one of a row and of a sequence that adjoin a corresponding rectangle and
that have a same minimum gray scale value as said dither cells of said
corresponding rectangle.

61. A method as claimed in claim 54, further comprising the steps of:
determining a position of an upper left corner, a height, a width and a gray scale value for
each of said rectangles with reference to said pages as said characteristic data; and
transmitting said characteristic data.

62. A method as claimed in claim 61, wherein said transmitting step includes
transmitting said characteristic data in compressed form.

63. A method as claimed in claim 39, further comprising the steps of:
removing said raster image data of said marked tiles from said data stream by subtraction; and

compressing a remaining data stream according to a standardized compression method and transmitting said remaining data stream.

64. A method as claimed in claim 62, wherein said standardized compression method is a FAX G4 compression method.

65. A method as claimed in claim 54, further comprising the steps of:
marking said rectangles that contain only dither cells to produce marked rectangles;
removing said raster image data of said marked rectangles from said data stream by subtraction; and
compressing a remaining data stream according to a standardized compression method and transmitting said remaining data stream.

66. A method as claimed in claim 65, wherein said standardized compression method is a FAX G4 compression method.

67. A method as claimed in claim 39, further comprising the step of:
transmitting data of said marked tiles according to an SPDS data format.

68. A method as claimed in claim 54, further comprising the step of:
transmitting data of said rectangles according to an SPDS data format.

69. A method as claimed in claim 63, further comprising the step of:
recompiling a transmitted image raster data using an OR function.

70. A method as claimed in claim 39, further comprising the step of generating said data stream of said image raster data from language elements of the graphics language using an RIP module.

71. A method as claimed in claim 70, wherein said RIP module is a POSTSCRIPT converter module.

72. A method as claimed in claim 39, further comprising the step of transmitting said raster data as print raster data to a printer.

73. A method as claimed in claim 72, wherein said printer is a high-performance printer.

74. A method as claimed in claim 73, wherein said high-performance printer has a printing output of at least 400 DIN A4 pages per minute at 600 dpi.

75. A system for compressing and transmitting image raster data, comprising:
an RIP module that generates a data stream of said image raster data page-by-page from language elements of a graphics language, said data stream containing gray image areas in a form of dither cells whose gray scale values are determined by model dither cells;
a two-dimensional grid network by which said image raster data of each page are divided into tiles, each tile including a plurality of image raster data,
an appertaining model dither cell and a gray scale value thereof are identified for each tile that contains only dither cells and this tile is marked; and
apparatus for transmitting characteristic data of the marked tiles for further processing of the image raster data, said characteristic data including information about a position of the respective tile and a respective gray scale value.

76. A system as claimed in claim 75, wherein said dither cells contain rectangularly
or quadratically arranged picture elements; and
    wherein the model dither cell with a higher gray scale value at least contains inked
picture elements at a same positions as the model dither cell with a next-lower gray scale
value.

77. A system as claimed in claim 75, further comprising:
a polygon formed by combining neighboring tiles with predetermined gray scale value
    corresponding to a model dither cell; and
    wherein said apparatus for transmitting transmits characteristic data of said polygon
for further processing of the image raster data.

78. A system as claimed in claim 77, wherein said apparatus for transmitting
includes an apparatus for transmitting said characteristic data in compressed format.

79. A system as claimed in claim 77, wherein said polygon is one of a square and a
rectangle.

80. A method for compressing and transmitting image raster data of pages,
comprising the steps of:
generating a data stream of image raster data page-by-page from language elements of a
    graphics language, said data stream containing gray picture elements in a form of
    dither cells whose gray scale values are defined by model dither cells;
determining at least one area that contains only dither cells;
identifying an appertaining model dither cell and a gray scale value of said at least one area
    and marking said at least one area; and
transmitting characteristic data of the marked area for further processing of the image raster
    data, said characteristic data contain information about a position of the respective

file and the respective gray scale value.

81. A method as claimed in claim 80, wherein said dither cells contain one of rectangularly and quadratically arranged picture elements; and

wherein said model dither cell with a higher gray scale value at least contains inked picture elements at a same positions as said model dither cell with a next-lower gray scale value.

82. A method as claimed in claim 81, wherein said dither cells of a rectangular region have a common minimum gray scale value.

83. A method as claimed in claim 82, further comprising the steps of:
producing a list of rectangles; and
transmitting said characteristic data of said list.

84. A method as claimed in claim 83, wherein said transmitting step transmits said characteristic data in compressed form.

85. A computer program product, comprising:
a computer-readable medium on which is stored a computer program having commands in encoded form, said computer program causing a computer to implement the following steps:
generating a data stream of image raster data from language elements of a graphics
    language, said data stream containing gray image areas in a form of dither cells
    whose gray scale values are determined by model dither cells;
dividing said image raster data of each one of said pages into tiles of a two-dimensional
    grid network, each of said tiles include a plurality of said image raster data;
identifying appertaining ones of model dither cells and said gray scale values for each of

said tiles that contains only dither cells, and marking said tiles that contains only
dither cells to produce marked tiles; and

transmitting characteristic data of said marked tiles for further processing of said image
raster data, said characteristic data containing information about a position of a
respective one of said tiles and a respective one of said gray scale values.

86. A computer program product, comprising:

a computer-readable medium on which is stored a computer program having commands in
encoded form, said computer program causing a computer to implement the following
steps:

generating a data stream of image raster data page-by-page from language elements of a
graphics language, said data stream containing gray picture elements in a form of
dither cells whose gray scale values are defined by model dither cells;

determining at least one area that contains only dither cells;

identifying an appertaining model dither cell and a gray scale value of said at least one area
and marking said at least one area; and

transmitting characteristic data of the marked area for further processing of the image raster
data, said characteristic data contains information about a position of the respective
tile and the respective gray scale value.

87. A computer program element, comprising:

commands in encoded form that cause a computer to implement the following steps:

generating a data stream of image raster data from language elements of a graphics
language, said data stream containing gray image areas in a form of dither cells
whose gray scale values are determined by model dither cells;

dividing said image raster data of each one of said pages into tiles of a two-dimensional
grid network, each of said tiles include a plurality of said image raster data;

identifying appertaining ones of model dither cells and said gray scale values for each of

said tiles that contains only dither cells, and marking said tiles that contains only
dither cells to produce marked tiles; and

transmitting characteristic data of said marked tiles for further processing of said image
raster data, said characteristic data containing information about a position of a
respective one of said tiles and a respective one of said gray scale values.

88. A computer program element as claimed in claim 87, wherein said computer
program element is present on a computer-readable medium.

89. A computer program element, comprising:

commands in encoded form that cause a computer to implement the following steps:

generating a data stream of image raster data page-by-page from language elements of a
graphics language, said data stream containing gray picture elements in a form of
dither cells whose gray scale values are defined by model dither cells;

determining at least one area that contains only dither cells;

identifying an appertaining model dither cell and a gray scale value of said at least one area
and marking said at least one area; and

transmitting characteristic data of the marked area for further processing of the image raster
data, said characteristic data contain information about a position of the respective
tile and the respective gray scale value.

90. A computer program element as claimed in claim 89, wherein said computer
program element is present on a computer-readable medium.

91. A computer-readable medium that contains a computer program, comprising:

the computer program on the computer-readable medium which causes a computer to
implement the following steps:

generating a data stream of image raster data from language elements of a graphics

language, said data stream containing gray image areas in a form of dither cells
whose gray scale values are determined by model dither cells;

dividing said image raster data of each one of said pages into tiles of a two-dimensional
grid network, each of said tiles include a plurality of said image raster data;

identifying appertaining ones of model dither cells and said gray scale values for each of
said tiles that contains only dither cells, and marking said tiles that contains only
dither cells to produce marked tiles; and

transmitting characteristic data of said marked tiles for further processing of said image
raster data, said characteristic data containing information about a position of a
respective one of said tiles and a respective one of said gray scale values.

92. A computer-readable medium that contains a computer program, comprising:
the computer program on the computer-readable medium which causes a computer to
implement the following steps:

generating a data stream of image raster data page-by-page from language elements of a
graphics language, said data stream containing gray picture elements in a form of
dither cells whose gray scale values are defined by model dither cells;

determining at least one area that contains only dither cells;

identifying an appertaining model dither cell and a gray scale value of said at least one area
and marking said at least one area; and

transmitting characteristic data of the marked area for further processing of the image raster
data, said characteristic data contain information about a position of the respective
tile and the respective gray scale value.